

## **Environmental Cooperative Agreement Summary**

This Environmental Cooperative Agreement (ECA) provides the structural framework for Cook Composites and Polymers Co. (CCP) and Wisconsin Department of Natural Resources (DNR) to prioritize and focus their resources to evaluate the feasibility and desirability of a waste minimization project to eliminate five million pounds of a characteristically hazardous wastewater and the need for a hazardous waste incinerator.

Specifically, CCP committed to cease burning hazardous waste in its incinerator by September 30, 2001. As part of this agreement, CCP also committed to establish an environmental management system (EMS), and seek other opportunities for waste minimization, pollution prevention, product stewardship and other environmental benefits at CCP's Saukville, Wisconsin facility in cooperation with its neighbors, its customers, the local community and DNR.

## **ECA Background Information**

The CCP Saukville facility manufactures polyester and alkyd resins used in a variety of applications including the coatings, sanitary, automotive and marine industries (SIC 2821 and 2851). The facility, located approximately 25 miles north of Milwaukee, began resin production in 1949 and employs approximately 65 full-time staff in Wisconsin.

CCP acquired the Saukville facility and other assets in December 1990 from Freeman Chemical Corporation. CCP is a joint venture company of TOTAL COMPOSITES INC., which is a subsidiary of the French oil, gas, refining, and chemical company TOTAL S.A. (TOTAL), and Curran Composites Inc. of Kansas City, MO. CCP operates in the ATOFINA chemical branch of TOTAL.

The CCP Saukville current production capacity is approximately 52 million pounds of resin per year, produced in up to 3000 batches. Waste streams generated at the facility consist primarily of reaction water, spent solvents, filter cleaning residues, and miscellaneous off-spec materials. Prior to the ECA, the facility historically disposed of two of the waste streams (reaction water and solvents) using an onsite RCRA licensed hazardous waste incinerator.

## Baseline Environmental Performance

In 2000, the CCP Saukville facility **generated approximately five (5) million pounds of a characteristic hazardous waste stream known as “esterification water”**, or more commonly **“reaction water”**. The reaction water is a by-product of a condensation reaction of organic acids and glycol that yields polyester and alkyd resins.

The reaction water waste stream was incinerated on site in a facility permitted under the Resource Conservation and Recovery Act (RCRA). The reaction wastewater stream is considered characteristically hazardous for ignitability (D001) based on the presence of low concentrations (<1%) of volatile organic chemicals, primarily xylene, that at times result in a flash point below 140 degrees F. The waste is occasionally characteristically hazardous for corrosivity (D002) due to low (<2 units) pH.

Further, in 2000, the CCP Saukville facility **generated approximately 1.8 million pounds of spent xylene solvent (F003) waste** that was also treated and disposed by the incinerator. Since the solvent has been used as supplemental fuel to incinerate reaction water, the alternatives of recycling the solvent was historically not considered economically attractive.

Additional environmental performance data for the baseline year 2001 and year 2002 are included as Attachment 1. The data includes air emissions, other waste stream data, and water discharges as reported in the annual Toxic Release Inventory (TRI) reports and available on the WDNR FACTS database. Additional data on natural gas consumption, electricity use, greenhouse gas emissions, and water use is also included.

## **ECA TARGETS AND RESULTS**

### **Regarding Commitment to Regulatory Schedule**

CCP recognized the economic, environmental, and community relations benefits associated with moving to waste minimization and pollution prevention approach for management of its hazardous wastes. The primary challenge was to synchronize the CCP technical and business evaluation of waste minimization and pollution prevention options with the regulatory requirements and regulatory review of Wisconsin DNR and U.S. EPA staff from many different environmental programs.

All regulatory reviews were completed in a timely manner that allowed CCP to meet its target for ending hazardous waste incineration.

### **Regarding Cost Savings from Regulatory Flexibility**

CCP revised and updated the incinerator Hazardous Waste Facility Feasibility and Plan of Operation Report (FPOR) according to the schedule in the DNR “call-in” letter. CCP did not request waste stream changes in the updated FPOR.

As a result, CCP was not required to provide a new trial burn test for the remaining period of operation. CCP saved an estimated \$400,000 (2001) of consultant and contractor direct costs, and hundreds of hours of CCP staff time. A trial burn test is normally conducted prior to licensing a facility, or as part of a 10-year permit renewal approval.

The WDNR also saved a considerable (but not yet defined) amount of staff time because WDNR staff were not required to review work plans and tests for a CCP facility that was about to close.

### **Regarding Waste Minimization and Pollution Prevention**

#### **Recovery of Xylene with Macro Porous Polymer Extraction (MPPE)**

CCP evaluated the viability of waste minimization and pollution prevention options for management of reaction water at the Saukville facility, and other CCP facilities in the United States. CCP commissioned a pollution prevention study specifically focused on recovery of the ignitable constituent xylene from the reaction water.

The purpose of the study was to evaluate options for reducing hazardous waste generated by eliminating the hazardous characteristics of the water. The reaction water study focused on a new, Macro Porous Polymer – Extraction (MPPE) technology developed by Akzo Nobel Inc. CCP also considered beneficial use of recovered xylene from reaction water, as well as the waste azeotrope xylene and rinse xylene.

CCP committed to and implemented the MPPE technology and ceased the burning of hazardous waste in its incinerator by September 30, 2001. This was two years before it would be required to do so under regulations promulgated by the US Environmental Protection Agency (US EPA). CCP received approval from WDNR for RCRA Closure of the CCP hazardous waste incinerator in June 2002.

### **Glycol Recovery from Reaction Water by Distillation**

CCP also commissioned a study of the recovery of glycol from reaction water using the Research and Development (R&D) resources of its majority partner, Atofina (Cray Valley) based in Paris, France.

The study considered current treatment and separation techniques to treat or recover glycol from reaction water. The feasibility study considered available technologies, including the demonstrated practice of distillation of glycol at a Cray Valley (Spain) facility. The summary report is included as Attachment 2. The study concluded that the economic effect of increased energy consumption of separating glycol from reaction water does not justify glycol recovery.

As CCP reported at its Community Advisory Committee meetings in July and October 2002, the implementation of glycol recovery could negatively affect the reliability of the thermal oxidizer, resulting in an increase in unplanned shutdowns and associated odors.

### **Reaction Water Treatment by Photocatalysis**

In late 2002, CCP was awarded a grant from *Wisconsin Focus on Energy* to fund research at UW-Madison on the photocatalysis of VOCs in reaction water. If trace levels of odor causing semi-volatile compounds could be selectively destroyed, the glycol/water would be more amenable to distillation recovery of glycol. The University of Wisconsin Chemical Engineering Department completed this study in 2003. Unfortunately, the esterification water was found to be resistant to photocatalysis treatment.

### **Reaction Water Pre-Treatment and Wastewater Discharge to POTW**

In the development of the ECA, CCP considered the potential for future pre-treatment and discharge of reaction water to a Publicly Owned Treatment Works (POTW). The ECA included provisions for a Baseline Monitoring Report (BMR) and submittal of the Plans and Specifications (P&S) for wastewater pre-treatment approval by WDNR. However, the US EPA ultimately defined the regulatory applicability of the reaction water treatment as a Totally-Enclosed Treatment Facility (TETF), and the pre-treatment approval for the non-hazardous wastewater incinerator became moot.

CCP included the operation of the non-hazardous incinerator in its air operating permit application. This air permit was issued in November 2003. Further, CCP currently has no plan to discharge to a POTW, so the development of BMR and P&S documents is no longer applicable.

## Xylene Waste Minimization

CCP has successfully implemented source reduction measures to reduce the volume of solvent xylene it uses in rinsing its process equipment. These measures resulted in a net decrease of xylene waste generation from approximately 1.8 million pounds per year (2000, 2001) to 1.57 million pounds per year (2002). CCP continues work on xylene source reduction opportunities as part of an Environmental Management Program (EMP) teams. An EMP is an environmental improvement project that is a basic element of a facility EMS.

Segregation of the solvent waste streams of **azeotrope solvent** (used for removal of water by-product during a resin cook) from the **rinse solvent** (used to clean reactor vessels, tanks, and piping) was completed with an August 2002 tank installation project.

The use of azeotropic solvent in resin production was reduced by segregating solvent from decanters and reusing the solvent in subsequent batches. This solvent, when spent, must be shipped for beneficial reuse / fuel blending since the odor of the solvent makes it unsuitable for a recycle – return program.

CCP implemented a new program to recycle and return rinse xylene with an off site service (Hydrite), in place of the former service (Brenntag). At current rates, CCP plans to manage approximately 440,000 pounds of xylene through recycling in 2003.

In 2002, CCP evaluated the feasibility of on-site xylene recycling using an agitated thin film evaporator (ATFE). The ATFE is the only recycling technology appropriate for solvent-resin mixtures due to their high viscosities. The estimated payback period of two to three years for this potential investment is not competitive because a cost-effective and local recycling service is available. Further, CCP plans continued reduction in the xylene usage that will continue to diminish the return on investment.

## **Regarding Community Relations and Stakeholder Involvement**

### **Community Advisory Committee**

1. CCP established an ongoing Community Advisory Committee (CAC) to involve all relevant stakeholders within the community including but not limited to:
  - Neighbors,
  - CCP Employees,
  - Area businesses,
  - Local elected and appointed officials,
  - Environmental groups
  - University faculty
  - DNR staff,
  - Local Emergency Planning Committee,
  - Public Works Department,
  - Fire Department,
  - Citizen groups,
  - Neighborhood associations,
  - Others in the greater Saukville area who may be affected by or interested in the CCP facility and its activities.
2. The CCP CAC met quarterly at CCP since January 2001, unless otherwise agreed upon by the committee. The meetings dates since the last report were October 2002, January 2003, April 2003, May 2003 (Air Permit Meeting) and July 2003. Meetings are open to the public, and open public comment is accommodated at a set time on each agenda.
3. CCP maintains an up-to-date list of the individuals participating on the Community Advisory Committee (CAC). CCP provides an up-to-date committee membership list and other information including agendas and meeting summaries to members of the CAC, the DNR, and the Saukville Public Library.

## Other Community Outreach Activity

CCP committed to provide additional opportunities for information exchange and dialogue with the community through implementation of its outreach plan including:

1. CCP developed a newsletter (CCP EnviroNews) that is used to regularly communicate with the advisory committee, and stakeholder residences and businesses in Saukville, and others who indicate an interest in CCP and its environmental performance.
2. CCP developed prototype chemical fact sheets for the local community and neighbors (Completed two fact sheets for DCPD and ethylene glycol. Ten (10) additional fact sheets identified by risk and usage and planned for completion by the end of 2003)
3. CCP planned a plant tour for the CAC and general public in Fall 2003. Due to logistical, economic and weather related issues, plant tour will be rescheduled for Spring 2004.
4. CCP repeated the Community Survey *biennially* (a change from original ECA based on Community feedback) to gauge public perception of CCP environmental performance changes. The second survey was conducted in 2002 (200 surveyed / 50 responded) The 2002 Community Survey results, and the comparison to 2000, were shared at the October 2002 CAC meeting This report is included as Attachment 3.
5. In 2003, CCP completed a survey of CCP performance from the perspective of the Community Advisory Committee (CAC). The summary report and tabulated results are included as Attachment 4a and 4b respectively.

## Regarding Implementation of Environmental Management Systems

In 2002 and 2003, CCP implemented an environmental management system that is based on the standards for environmental management systems issued by the International Organization for Standardization (ISO) or that has equivalent components.

Kestrel Management Services was retained by CCP to assist in the training, coaching and facilitation of the CCP Working Group charged with implementation of an integrated environmental management system (EMS). Working sessions began in September 2002, and CCP is now preparing for an ISO 14001 registration audit by DNV in early 2004. DNV or Det Norske Veritas is an internationally recognized registrar for ISO 9000 and ISO 14000 standards.

CCP has already developed management system programs such as Product Stewardship and Transportation Management in the context of the industry initiatives of [Coatings Care<sup>TM</sup>](#) (National Paint and Coatings Association) and [Composites Care<sup>SM</sup>](#) (Composite Fabricators Association).

The agreement signed in 2001 proposed using the DNV Prosper<sup>TM</sup> auditing system. This system has been discontinued by DNV. CCP will instead use the Atofina Integrated Management System<sup>TM</sup> (AIMS) and its associated audit software SUMMIT<sup>TM</sup> that was developed in partnership with DNV, and is an improvement and replacement to DNV Prosper<sup>TM</sup>. AIMS integrates Quality, Safety and Environment (QSE) management systems, as well as Responsible Care<sup>TM</sup> Codes into a consistent and objective management system and auditing framework.

CCP Saukville completed an internal integrated management system audit the week of September 29, 2003. The results of the audit were very favorable indicating a well-developed management system. CCP scored over 89% conformance with the EMS requirements of Element 21 in the AIMS<sup>TM</sup> audit protocol and 62% of all associated ISO 14001 points under the AIMS system. The requirements of Element 21 of AIMS<sup>TM</sup> generally exceed those of the ISO 14001 Standard. The AIMS Baseline Assessment report is included as Attachment 5.

CCP plans a third-party ISO 14001 registration audit of the EMS in early 2004 using DNV.



## Regarding Progress to Superior Environmental Performance

### Progress for CCP Saukville

As part of the commitment to Superior Environmental Performance, CCP committed to going beyond what would otherwise be required in environmental regulations by setting the following goals for its Saukville facility:

- Through waste minimization and pollution prevention, eliminate or significantly reduce the waste streams that were previously burned in its hazardous waste incinerator without transferring them to another environmental media.
  - ✓ Through its waste minimization efforts CCP ceased the on site incineration of nearly seven million pounds of hazardous waste annually. Every post-MPPE wastewater batch since September 30, 2001, met the criteria for non-hazardous wastewater for ignitability with measured flash point of greater than 200 F, and for corrosivity with pH > 5 to 6.

The results of the MPPE system xylene recovery efficiency are included as Attachment 6. The system attained xylene removal levels over 99% in operating years 2001, 2002 and 2003, but CCP must continue improvement on MPPE operating consistency.

- ✓ In 2003, using **source reduction**, CCP reduced xylene solvent waste by over 200,000 pounds from 2001. CCP expects further reductions in 2004. See Table 1 for details. Source reduction has also contributed to substantial reduction in xylene use as shown in Table 2. Source reduction efforts included reducing rinse volumes, segregation and reuse of azeotrope solvent, and the CCP production shift toward water-based polymer dispersions.
- ✓ CCP will **recycle for reuse** approximately 440,000 pounds of spent xylene solvent in 2003 using off-site distillation. This will reduce waste disposal by approximately 25% from 2001 levels.
- ✓ CCP managed a projected 1,070,000 pounds of xylene solvent waste by **off-site beneficial reuse for energy recovery** for 2003. The CCP solvent is a cleaner fuel alternative for cement kilns compared with other hazardous waste, resulting in reduced emission at the respective kiln. US EPA refers to these types of wastes as “comparable fuels” because they are typically cleaner to burn (lower NOx, SOx etc.) than traditional fuel oil.

- ✓ The details of other relevant environmental data for the baseline year 2001, including air emissions, water discharges, and other waste streams, as reported by CCP in the Toxic Release Inventory (TRI) are included as the Attachment 1.
- ✓ Summary performance of broader environmental performance data (including natural gas consumption, electricity, water, wastewater, etc.) is measured for years 2001 and 2002, and included as Attachment 1.

## **Regarding Progress to Superior Environmental Performance**

### **Progress for CCP Saukville (Continued)**

- To establish a long-term reduction in the amount of wastes generated and contaminants and pollutants released giving priority to those pollutants, contaminants and wastes of highest health and environmental concern (SEE ABOVE, AND TABLE 1 & 2)
- Through implementation of the CCP EMS, continuously improve CCP practices to minimize environmental impacts and conserve natural resources and to work cooperatively with its neighbors, the local community and others. (SEE ABOVE)
- CCP retained Kestrel Management Services LLC to complete an environmental compliance audit of the CCP Saukville facility. The Executive Summary of the audit is included as Attachment 7.
- To take leadership in Product Stewardship, integrating environmental considerations into the design and development of products.
  - ✓ CCP led the commercial development of low-styrene (low HAP) composite resins as well as water-based alkyd/acrylic dispersions used in water-based coatings and stains. The development of products using the water-based dispersion technology has contributed to a substantial reduction in xylene use as shown in Table 2.
  - ✓ CCP low-VOC resins (LOVOCOR<sup>TM</sup>) and low-HAP (Styrene) and MACT-compliant resins (MC<sup>TM</sup> Series) are industry technology leaders. CCP will help customers meet MACT requirements using pollution prevention, rather than pollution control.
  - ✓ CCP continues growth and development of a profitable product line of aqueous cleaners (Thermaclean<sup>TM</sup>) and no-HAP and low VOC emission solvent cleaners (Unisolve<sup>TM</sup>) for use in the composites fabrication industry.

## TABULATED RESULTS OF POLLUTION PREVENTION PROGRESS

**TABLE 1 - XYLENE WASTE MINIMIZATION (Source Reduction & Recycling)**

<b>Year</b>	<b>Spent Solvent (lbs/year)</b>	<b>Solvent Purchase Savings (\$/year)</b>	<b>Solvent Incinerated (lbs/year)</b>	<b>Solvent Recycled (lbs/year)</b>	<b>Beneficial Reuse - Fuel (lbs/year)</b>
<b>2000</b>	<b>1,774,000</b>	<b>0</b>	<b>1,774,000</b>	<b>0</b>	<b>0</b>
<b>2001</b>	<b>1,728,500</b>	<b>0</b>	<b>1,300,000</b>	<b>80,500</b>	<b>348,000</b>
<b>2002</b>	<b>1,570,000</b>	<b>\$90,000</b>	<b>0</b>	<b>230,000</b>	<b>1,340,000</b>
<b>2003*</b>	<b>1,510,000*</b>	<b>\$172,500*</b>	<b>0</b>	<b>440,000*</b>	<b>1,070,000*</b>

\* Projected through 2003 year end.

**TABLE 2 - XYLENE PURCHASING HISTORY**

<b>Manufacturing Year</b>	<b>Xylene Purchase</b>
<b>2000</b>	<b>4,076,540</b>
<b>2001</b>	<b>3,159,320</b>
<b>2002</b>	<b>2,937,060</b>
2003 YTD (Oct. 1, 2003)	2,190,000
<b>2003 Estimate**</b>	<b>2,740,000**</b>

\*\* Projected through 2003 year end and includes recycled solvent. It also reflects the increased production shift by CCP to water-based polymer dispersions.

## **Attachment List**

**Attachment 1 – Environmental Performance Data 2001 - 2002**

**Attachment 2 – Glycol Recovery Feasibility Study (Cray Valley, 2003)**

**Attachment 3 – 2002 Community Survey (Skavroneck, 2002)**

**Attachment 4a – 2003 Community Advisory Committee (CAC) Survey - Summary Report (Skavroneck, 2003)**

**Attachment 4b – 2003 Community Advisory Committee (CAC) Survey - Table (Skavroneck, 2003)**

**Attachment 5 – AIMS Baseline Assessment Report (Atofina) - October 2003**

**Attachment 6 – MPPE Sampling Results (SAU)**

**Attachment 7 – ECA Audit Report Executive Summary (Kestrel) - October 2003**